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BIBLIOGRAPHY AND INDEX OF RESEARCH IN HUMAN AND ANIMAL VIGILANCE 1961—1965

by

Richard L. Martz and J. Donald Harris

Bureau of Medicine and Surgery, Navy Department Research Project MR005.14-2001-5.02

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### BIBLIOGRAPHY AND INDEX OF RESEARCH IN HUMAN AND ANIMAL VIGILANCE 1961—1965

The early literature on vigilance research has recently been brought together in a bibliography\* listing some 200 titles and covering most studies up to 1961. The present bibliography, listing some 170-odd new titles including papers on the rhesus monkey and cat, covers the reference period from 1961 to mid-1965 and brings this vigilance bibliography up to that date. Reference sources are the Psychological Abstracts and the articles themselves. Most citations are verified.

Articles are listed alphabetically by author. Most entries represent journal articles, the publications of military laboratories, and doctoral dissertations. Titles of papers appearing in more than one version or edition are given in their various forms. Abstracts not followed by publication are omitted.

Verifying numbers for articles cited in Psychological Abstracts, some "AD"-document\*\* numbers, and the addresses of document-issuing agencies are appended in brackets to facilitate the procurement of reprints. A rudimentary index prepared from article titles, abstracting descriptors and, in some cases, the papers themselves appear at the end of the bibliography.

The authors gratefully acknowledge the library facilities extended to them by Smith College, Connecticut College, and Yale University, during the preparation of this report.

<sup>\*</sup>McGrath, James J. (1961) A bibliography of research on human vigilance. Human Factors Suppl. Note to Tech. Rep. #1, 15pp. (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.).

<sup>\*\*</sup>Obtainable from Defense Documentation Center, Cameron Sta, Alexandria, Virginia, 22314 (for "qualified" requesters); all others use Clearinghouse for Federal Scientific & Technical Information, Springfield, Va., 32151

- Adams, Jack A. (1963) Experimental studies of human vigilance: final report USAF ESD Tech. docum. Rep. E63-320, vi, 35pp. (Decisions Sciences Laboratory, Electronic Systems Division, Air Force Systems Command, U. S. Air Force, L. G. Hanscom Field, Bedford, Mass.) (Psychol. Abstr., 1964, #3638)
- 2. Adams, Jack A & L. R. Boulter (1962) An evaluation of the activationist hypothesis of human vigilance. J. exp. Psychol., 64, 495-504 (Psychol. Abstr., 1963, #6081)
- 3 Adams, Jack A. & L. R. Boulter (1964) Spatial and temporal uncertainty as determinants of vigilance behavior J. exp. Psychol., 67, 127-31. (Psychol. Abstr., 1964, #6992)
- Adams, Jack A. & J. M. Humes (1963) Monitoring of complex visual displays: IV. Training for vigilance Hum. Factors, 5, 147-53. (AD417876)
- 5 Adams, Jack A. & L. V. Xhignesse (1960) Some determinants of two-dimensional visual tracking behavior. J. exp. Psychol., 60, 391-403.
- Adams, Jack A., J. M. Humes & N. A. Sieveking (1963) Monitoring of complex visual display: V. Effects of repeated sessions and heavy visual load on human vigilance. Hum. Factors, 4, 385-89.
   (Psychol. Abstr., 1965, #264)
   (AD 434 430)
- Adams, Jack A., J. M. Humes & H. H. Stenson (1962) Monitoring of complex visual displays: III. Effects of repeated sessions on human vigilance. Hum. Factors, 4, 149-58.
   (Psychol. Abstr., 1964, #6781)
- 8. Adams, Jack A., H. H. Stenson & H. M. Humes (1961) Monitoring of complex visual displays: II. Effects of visual load and response complexity on human vigilance. Hum. Factors, 3, 213-21.

  (Psychol. Abstr., 1964, #1502)
- Adams, Oscar S. & W D Chiles (1960) Human performance as a function of the work-rest cycle USAF WADD Tech. Rep. #60-248, ii, 18pp.
   (Behavioral Sciences Laboratory, Wright Air Development Division, Aerospace Medical Division, Wright-Patterson Air Force Base, Ohio)
   (Psychol. Abstr., 1961, #7310)
- Alluisi, E. A. & T. J. Hall (1963) Declines in auditory vigilance during periods of high multiple-task activity. Percept. mot. Skills, 16, 739-40. (Psychol. Abstr., 1964, #5204)
  - 11. Antrobus, John Simmons (1963) The effects of varied repetitive talking on visual vigilance performance under external stimulation. Ph.D. Diss., Columbia Univ., 112pp.
  - 12. ——Diss. Abstr., 1964, 24, 3431.
- 13.) Bakan, Paul (1963) An analysis of retrospective reports following an auditory vigilance task. In D. N. Buckner & J. J McGrath (eds.), Vigilance a symposium. NY: McGraw-Hill, pp. 88-100.
- Bakan, Paul (1963) Time-of-day preference, vigilance and extraversion-introversion In. D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 114-17.

- Bakan, Paul, J. A. Belton & J. C. Toth (1963) Extraversion-introversion and decrement in an auditory vigilance task. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 22-28.
- Bakan, Paul & R. Manley (1963) Effect of visual deprivation on auditory vigilance. Brit. J. Psychol., 54, 115-19.
  (Psychol. Abstr., 1964, #256)
- 17. Baker, C. H. (1961) Maintaining the level of vigilance by means of knowledge of results about a secondary vigilance task. Ergonomics, 4, 311-16. (Psychol. Abstr., 1962, #5CE11B)
- 18. Baker, C. H. (1962) Man and radar displays. NY: Pergamon Press.
- 19. Baker, C. H. (1962) On temporal extrapolation. Canad. J. Psychol., 16, 37-41. (Psychol. Abstr. 1963, #340)
- 20. Baker, C. H. (1962) Probability of signal detection in a vigilance task. Science, 135, 46.
  (Psychol. Abstr., 1963, #254)
- 21. Baker, C. H. (1963) Consistency of performance in two visual vigilance tasks. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp 43-51.
- 22. Baker, C. H. (1963) Further toward a theory of vigilance. In. D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 127-70.
- 23. Baker, C. H. (1963) Signal duration as a factor in vigilance tasks. Science, 141, 1196-97.

(Psychol. Abstr., 1964, #4785)

- Baker, C. H. & A. Harabedian (1962) A study of target detection by sonar operators. Human Factors Problems in Anti-Submarine Warfare Tech. Human Factors Rep. #206-16.
  - (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.)
- 25. Baker, C. H. & A. Harabedian (1962) Performance in an auditory vigilance task while simultaneously tracking a visual target. Human Factors Tech. Rep. #740-2. (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.)
- Baker, C. H. & J. O'Hanlon (1963) The use of reference signals in a visual vigilance task: 1. Reference signals continuously displayed. Human Factors Research Tech. Rep. #750-1, 38pp. (Human Factors Research, Inc., 1112 Crenshaw Blvd, Los Angeles 19, Calif.) (AD 425 998)
- 27. Baker, R. A., R. R. Sipowicz & J. R. Ware (1961) Effects of practice on visual monitoring. Percept. mot. Skills, 13, 291-94.
- 28. Baker, R A., J. R. Ware & R. R. Sipowicz (1962) Sustained vigilance: I. Signal detection during a 24-hour continuous watch Psychol. Rec., 12, 245-50. (Psychol. Abstr., 1964, 3624)
- 29. Baker, R. A., J R. Ware & R. R. Sipowicz (1962) Vigilance: a comparison in auditory, visual and combined audio-visual tasks Canad. J. Psychol., 16, 192-98. (Psychol. Abstr., 1963, #4142)
- Barratt, P. E. H. & H. C. Beh (1964) Sublimal discrimination and the concept of vigilance. Australian J. Psychol., 16, 107-19.
   (Psychol. Abstr., 1965, #6707)

- 31. Bell, C. R., K. A. Provins & R. W. Hiorns (1964) Visual and auditory vigilance during exposure to hot and humid conditions Ergonomics, 7, 279-88. (Psychol. Abstr., 1965, #6148)
- 32. Bente, D., F. A. Hoffmann, H. Hartung & M. L. Hartung (1964) L'Influence des neuroleptiques sur la vigilance: experiences cliniques concernant leurs effets sur l'EEG le systeme gamma et le niveau de performance. Encephale, 53 (Suppl. #1), 143-50.

  (Psychol. Abstr., 1965, #913)
- Bergum, Bruce O. (1963) Vigilance: a guide to improved performance. HumRRO Res. Bull. #10, 33pp.

  Human Resources Research Office, George Washington University, Washington, D C.)

  (Psychol. Abstr., 1964, #6673)

  (AD 424 888)
- Bergum, Bruce O. & C. I. Klein (1961) A survey and analysis of vigilance research. HumRRO Res. Rep. #8, 56pp.
   (Human Resources Research Office, George Washington University, Washington, D. C.)
   (Psychol. Abstr., 1962, #5CE56B)
- 35 Bergum, Bruce O. & D. J. Lehr (1962) Vigilance performance as a function of paired monitoring. J. appl. Psychol., 46, 341-43.
  (Psychol. Abstr., 1963, #5759)
- 36. Bergum, Bruce O & D. J. Lehr (1962) The effects of pairing, rest intervals, signal rate and transfer conditions on vigilance performance. HumRRO Res. Memo, Subtask Vigil IV, iii, 69pp.
  (Human Resources Research Office, George Washington University, Washington, D. C.)
  (Psychol. Abstr., 1963, #4320)
  (AD-605 151)
- 37. Bergum, Bruce O. & D. J Lehr (1962) Vigilance performance as a function of interpolated rest. J. appl. Psychol., 46, 425-27.
- Bergum, Bruce O. & D. J. Lehr (1963) Vigilance performance as a function of task and environmental variables. HumRRO Res. Rep. #11, vii, 32pp. (Human Resources Research Office, George Washington University, Washington, D. C.)
  (Psychol. Abstr., 1964, #1900)
  - 39. Bergum, Bruce O. & D. J. Lehr (1963) End spurt in vigilance. J. exp. Psychol., 66, 383-85.
    (Psychol. Abstr., 1964, #3445)
  - 40. Bergum, Bruce O. & D. J. Lehr (1963) Effects of authoritarianism on vigilance performance J. appl. Psychol., 47, 75-77.
  - 41. Bergum, Bruce O. & D. J Lehr (1964) Monetary incentives and vigilance. J. exp. Psychol., 67, 197-98 (Psychol. Abstr., 1964, #6997)
- 42. Binford, John R & M Loeb (1963) Monitoring readily detected auditory signals and detection of obscure visual signals. Percept. mot. Skills, 17, 735-46 (Psychol. Abstr., 1964, #4924)

- 43. Boulter, Lawrence R. & J. A. Adams (1963) Vigilance decrement, the expectancy hypothesis and intersignal interval. Canad. J. Psychol., 17, 201-09. (Psychol. Abstr., 1964, #1901)
- 44. Bowen, Hugh M. (1964) Vigilance as a function of signal frequency and flash rate. Percept. mot. Skills, 18, 333-38.
  (Psychol. Abstr., 1965, #3670)
- 45. Broadbent, D. E. (1963) Some recent research from the applied psychology research unit, Cambridge. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 72-82.
- 46. Broadbent, D. E. (1963) Possibilities and difficulties in the concept of arousal. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 184-92.
- 47. Broadbent, D. E. (1964) Vigilance. Brit. Med. Bull., 20, 17-20. Psychol. Abstr., 1964, #7249)
- 48. Broadbent, D. E. & M. Gregory (1963) Vigilance considered as a statistical decision. Brit. J. Psychol., 54, 309-23.
  Psychol. Abstr., 1965, #575)
- 49. Broadbent, D. E. & M. Gregory (1963) Division of attention and the decision theory of signal detection. Proc. Roy. Soc., B, 158, 222-31.
- 50. Buckner, Donald N. & J. J. McGrath (1963) A comparison of performance on single and dual sensory mode vigilance tasks. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 53-68.
- 51. ——(1961) Human Factors Research Tech. Rep. #8.

  (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.)
- 52. Buckner, Donald N. (1963) An individual-difference approach to explaining vigilance performance. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp 171-79.
- 53. Buckner, Donald N. & J. J. McGrath (eds.) (1963) Vigilance: a symposium. NY: McGraw-Hill, 269pp.
- 54. Canestrari, Robert E'Milio (1962) The relationship of vigilance to paced and self-paced learning in young and elderly adults.
  Ph.D. Diss., Duke Univ., 114 pp.
- 55. ——(1963) Diss. Abstr., 24, 2130-31. (Psychol. Abstr., 1964, #9982)
- 56. Chiles, W. Dean, R. E. Fox, J. H. Rush & D. W. Stılson (1962) Effects of ionized air on decision making and vigilance performance. USAF MRL Tech. docum. Rep. #62-51, iii, 10pp. (Behavior Sciences Laboratory, Wright Air Development Division, Aerospace Medical Division, Wright-Patterson Air Force Base, Ohio. (Psychol. Abstr., 1964, #3299)
- 57. Chinn, Ralph McCalley (1962) The effect of knowledge of results on vigilance performance. Ph D. Diss., Emory Univ., 57pp.
- 58. ——(1963) Diss. Abstr., 23, 2590-91.

- 59. Chinn, Ralph McC. & E. A. Alluisi (1964) Effect of 3 kinds of knowledge-of-results information on 3 measures of vigilance performance. Percept. mot. Skills, 18, 901-12.

  (Psychol. Abstr., 1965, #3653)
- 60. Colquhoun, W P (1962) Effects of hyoscine and meclozine on vigilance and short-term memory. Brit. J. industr. Med., 19, 287-98.
- 61 Colquhoun, W. P (1962) Effets d'une faible does d'alcohol et de certains autres facteurs sur la performance dans une tache de vigilance (Effects of a small dosage of alcohol and other factors on the performance of a task requiring visual vigilance). Bull. Cent. Etud. Rech. Psychotech., 11, 27-44 (Psychol. Abstr., 1963, #6285)
- 62 Corcoran, D. W. J. (1963) Individual differences in performance after loss of sleep. Ph.D. Thesis, U. Cambridge.
- 63. Corcoran, D W J. (1963) Doubling the rate of signal presentation in a vigilance task during sleep deprivation. J. appl. Psychol., 47, 412-15.

  (Psychol. Abstr., 1964, #6771)
- Dardano, Joseph Francis (1959) The relationships of intermittent noise, intersignal interval and basal skin conductance to vigilance behavior. Ph.D. Diss., Univ Maryland, 98pp.
- 65 ——(1960) Diss. Abstr., 20, 4182. (Psychol. Abstr. 1960, #8487)
- Dardano, Joseph F. & I. Mower (1962) Relationships of intermittent noise, intersignal interval and skin conductance to vigilance behavior. J. appl. Psychol., 46, 106-14.
- 67. Davies, D. R. & S. Griew (1963) A further note on the effect of aging on auditory vigilance performance: the effect of low signal frequency. J. Geront., 18, 370-71. (Psychol. Abstr., 1964, #4936)
- Dobbins, D. A. (1962) Monitor performance task: status report. USA PRO OCRD Tech. Rep. #1128, 26pp.
  (U S Army Personnel Research Office, Washington 25, D C)
  (Psychol. Abstr., 1963, #7336)
- Dobbins, D. A., D. M. Skordahl & A. A. Anderson (1961) Prediction of vigilance: AASHO Road Test. USA PRO OCRD Tech. Res. Note #119, 30pp.
  (U. S. Army Personnel Research Office, Washington 25, D. C.)
  (Psychol. Abstr., 1963, #2164)
- Dobbins, D. A., J. G. Tiedemann & D. M. Skordahl (1963) Vigilance under highway driving conditions. Percept. mot. Skills, 16, 38.
   (Psychol. Abstr., 1964, #1469)
- 71. Dumont-Tyc, S. & P. Dell (1961) Analyse electrophysiologique de l'arc reflexe vestibulo-oculaire (Electrophysiological analysis of the vestibulo-ocular reflex arc). J. physiol. Paris, 53, 316-17. (Psychol. Abstr., 1962, #2DB16D)
- 72. Eason, Robert G., A. Beardshall & S. Jaffee (1965) Performance and physiological indicants of activation in a vigilance situation. Percept. mot. Skills, 20, 3-13.

- 73. Egan, James P, G. Z. Greenberg & H. I. Schulman (1961) Operating characteristics, signal detectability and the method of free response. J. acoust. Soc. Amer., 33,993-1007.
- Enticknap, L. E. (1961) The persistence of non-veridical perception. Brit. J. Psychol., 52, 341-48.
   (Psychol. Abstr., 1962, #4BC41E)
- 75. Faulkner, T. W. (1962) Variability of performance in a vigilance task. J. appl. Psychol., 46, 325-28.
  (Psychol. Abstr., 1963, #5829)
- 76. Frankmann, Judity P. & J. A. Adams (1962) Theories of Vigilance. Psychol. Bull., 59, 257-72.
  (Psychol. Abstr., 1963, #6082)
- 77. Gastaut, H. & J. Bert (1961) Electroencephalographic detection of sleep induced by repetitive sensory stimuli. In G.E.W. Wolstenhomme & M. O'Connor (eds.), The Nature of Sleep. Boston: Little Brown, 1961, pp. 260-71. (Psychol. Abstr., 1962, #5DG60G)
- 78. Gettys, Charles F. (1964) The alerted effective threshold in an auditory vigilance task. J. audit. Res., 4, 23-38.
- 79. Griew, S. & D. R. Davies (1961) Effect of aging on auditory vigilance J. Geront., 17, 88-90. (Psychol. Abstr., 1962, #5FI88G)
- 80. Grodsky, M. A., G. W. Levy & A. B. Miller (1962) An investigation of human performance in monitoring situations. MM Spa System Res. Memo RM-109. (Martin-Marietta Space Systems Division, Baltimore, Md.)
- 81. Gruber, Alin (1963) Sensory alternation and performance in a vigilance task. Decia. Sci. Lab. Tech. docum. Rep. #63-605, 29pp. (Decision Sciences Laboratory, Deputy for Engineering and Technology, Electronic Systems Division, Air Force Systems Company, L G. Hanscom Field, Bedford, Mass.) (AD 417 444)
- Haider, Manfred (1963) Experimentelle Untersuchungen uber Daueraufmerksamkeit und cerebrale Vigilanz bei eniformigen Tatigkeiten (Experimental investigations on continued attention and cebral vigilance during monotonous tasks).
   exp. Angew. Psychol., 10, 1-18.
   (Psychol. Abstr., 1964, #1470)
- 83. Haider, Manfred & N. F. Dixon. (1961) Influence of training and fatigue on the continuous recording of a visual differential threshold. Brit. J. Psychol., 52, 227-37.
- 84. Haider, Manfred, P. Spong & D. B. Lindsley (1964) Attention, vigilance and cortical evoked-potentials in humans. Science, 144, 180-82. (Psychol. Abstr., 1965, #4136)
- 85. Hardesty, D., D. Trumbo & W. Bevan (1963) Influence of knowledge of results on performance in a monitoring task. Percept. mot. Skills, 16, 629-34 (Psychol. Abstr., 1964, #4945)
- 86. Hauty, George T. (1960) Psychological problems of space flight. In Otis O. Benson, Jr. & H. Strughold (eds.), Physics and medicine of the atmosphere and space. NY: Wiley, pp. 409-21. (Psychol. Abstr., 1960, #8472)

- 87. Hawkes, G. R. & M. Loeb (1961) Vigilance for auditory and cutaneous signals. J. audit. Res., 1, 272-84.
- -88. Hawkes, G. R. & M. Loeb (1962) Vigilance for cutaneous and auditory stimuli as a function of intersignal interval and signal strength. J. Psychol., 53, 211-218. (Psychol. Abstr., 1962, #4CE11H)
  - 89. —(1961) USA MRL Rep. #511, 8pp. (Psychol. Abstr., 1962, #4GE08H)
  - 90 Holland, James G (1963) Human vigilance. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 247-64.
  - 91. Howland, Daniel & E. L. Wiener (1963) The system monitor. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 217-23.
  - 92 Jerison, Harry J. (1963) On the decrement function in human vigilance. In D. N. Buckner & J. J. McGrath (eds), Vigilance: a symposium. NY: McGraw-Hill, pp. 199-212.
  - 93. Jerison, Harry J. & R. M. Pickett (1963) Vigilance: a review and re-evaluation. Hum. Factors, 5, 211-38.
    (Psychol. Abstr., 1965, #291)
    (438-394)
  - 94. Jerison, Harry J. & R. M. Pickett (1964) Vilgilance: the importance of elicited observing rate. Science, 143, 970-71.

    (Psychol. Abstr., 1964, #9627)
  - 95. Jerison, Harry J. & J. F. Wing (1963) Human vigilance and operant behavior. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 34-38.
- 96. —(1961) Science, 133, 880-81.
- Kidd, J. S. & A. Micocci (1964) Maintenance of vigilance in an auditory monitoring task. J. appl. Psychol., 48, 13-15.
  (Psychol. Abstr., 1964, #9317)
- 98. Kirk, R E & E Hecht (1963) Maintenance of vigilance by programmed noise Percept. mot. Skills, 16, 553-60
  (Psychol. Abstr., 1964, #1904)
- 99. Klingberg, Carl Lennart (1962) Monitoring performance as a function of auditory, visual and audio-visual display systems.
  Ph.D. Diss., Univ. Rochester, 116 pp.
- 100. —(1963) Diss. Abstr., 24, 851.
- 101. Laties, Victor G. & B. Weiss (1960) Human observing behavior after signal detection. J. exp. anal. Behav., 3, 27-33.
- 102 Leplat, Jacques (1962) Dispersion des signaux et niveau de vigilance. (Dispersion of signals and level of vigilance). Annee Psychol., 62, 17-28. (Psychol. Abstr., 1963, #8360)
- 103. Loeb, Michael & G. R. Hawkes (1961) The effect of rise and decay time on vigilance for weak auditory and cutaneous stimuli.

  Percept. mot. Skills, 13, 235-42.

- 104. —(1961) USA MRL Rep. #491, ii, 11 pp.
  (Psychology Division, U. S. Army Medical Research Laboratory, Ft. Knox, Ky.)
  (Psychol. Abstr. 1962, #3CE11L)
- 105. Loeb, Michael & G. R. Hawkes (1962) Detection of differences in duration of acoustic and electrical cutaneous stimuli in a vigilance task. J. Psychol., 54, 101-11.

  (Psychol. Abstr., 1963, #2427)
- Loeb, Michael & E. A. Schmidt (1963) A comparison of the effects of different kinds of information in maintaining efficiency on an auditory monitoring task. Ergonomics, 6, 75-81.
- 107. Luce, Terrence Samuel (1963) Vigilance as a function of stimulus variety and response complexity. Ph.D. Diss., Univ. Maryland, 39pp.
- 108. —(1964) Diss. Abstr., 24, #5571. (Psychol. Abstr., 1965, #3319)
- 109. McBain, William N. (1961) Noise, the "arousal hypothesis" and monotonous work. J. appl. Psychol., 45, 309-17. (Psychol. Abstr., 1962, #5LG09M)
- 110. McCormack, P. D (1962) A 2-factor theory of vigilance. Brit. J. Psychol., 53, 357-63.
   (Psychol. Abstr., 1963, #7546)
- 111. McDonald, R. D. & S. B. Burns (1964) Visual vigilance and brain damage: an empirical study. J. Neurol. Neurosurg. & Psychiat., 27, 206-09. (Psychol. Abstr., 1965, #8356)
- 112. McGrath, James J. (1961) A bibliography of research on human vigilance. Human Factors Problems in Anti-Submarine Warfare Hum Factors Suppl. Note, Tech. Rep. #1. (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.) (AD 256488)
- 113. McGrath, James J. (1961) The effect of irrelevant environmental stimulation on vigilance performance. Ph.D. Diss., Univ. Southern Calif.
- 114 —(1961) Diss. Abstr., 22, 336. (Psychol. Abstr., 1963, #343)
- 115. —McGrath, James J. (1960) Human Factors Research Tech. Rep. #6. (Human Factors Research Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.)
- 116. —(1963) In D. N. Buckner & J. J. McGrath (eds.) Vigilance: a symposium. NY: McGraw-Hill, pp. 3-19.
- 117. McGrath, James J. (1962) Performance sharing in dual-mode monitoring Human Factors Research, Tech. Rep. #740-1.

  (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.)
- 118. McGrath, James J (1963) Cross-validation of some correlates of vigilance performance. In D. N. Buckner & J. J. McGrath (eds), Vigilance: a symposium. NY: McGraw-Hill, pp. 118-23
- 119. McGrath, James J. (1963) Some problems of definition and criteria in the study of vigilance performance. In D. N Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 227-37.

- 120. McGrath, James J. & A. Harabedian. (1963) Signal detection as a function of intersignal-interval duration. In D. N. Buckner & J. J. McGrath (eds.), Vigilance: a symposium. NY: McGraw-Hill, pp. 102-09.
- 121. Mackworth, Jane F. (1963) The effect of intermittent signal probability upon vigilance. Canad. J. Psychol., 17, 82-89. (Psychol. Abstr., 1964, #258)
- 122. Mackworth, Jane F. (1964) The effect of true and false knowledge of results on the detectability of signals in a vigilance task. Canad. Rev. Psychol., 18, 106-17. (Psychol. Abstr., 1965, #577)
- 123. Mackworth, Jane F. (1964) Performance decrement in vigilance, threshold and high-speed perceptual motor tasks. Canad. J. Psychol., 18, 209-23. (Psychol. Abstr., 1965, #3660) (AD 612 743)
- 124. Mackworth, Jane F. & M. M. Taylor (1963) The d'measure of signal detectability in vigilance-like situations. Canad. J. Psychol., 17, 302-25. (Psychol. Abstr., 1964, #7042)
- 125. Mackworth, N. H. & I. T. Kaplan (1964) Eye movements during vigilance. Percept. mot. Skills, 18, 397-402 (Psychol. Abstr., 1965, #3559)
- 126. Mangan, G. L. (1962) Generalisation of perceptual vigilance and defence. Percept. mot. Skills, 14, 171-78.

  (Psychol. Abstr., 1963, #1342)
- 127. Mangan, G. L. & C. J. Adcock (1962) EEG correlates of perceptual vigilance and defence. Percept. mot. Skills, 14, 197-98.
  (Psychol. Abstr., 1963, #576)
- 128. Micko, Hans Christoph (1963) Uber den Einsatz zweier Beobachter bei Dauerbeobachtung statigkeiten (On the use of 2 observers in continuous vigilance tasks). Z. exp. angew. Psychol., 10, 35-45.
  (Psychol. Abstr., 1964, #259)
- 129. Monty, R. A. (1962) Effects of post-detection response complexity on subsequent monitoring behavior Hum. Factors, 4, 201-08
- 130. Myers, Thomas I., S. Smith and D. B. Murphy (1963) Pioneer VI. Vigilance as a function of sensory deprivation and social isolation. George Wash. Univ. Res. Memo, 90 pp. (AD-439 432)
- 131. O'Hanlon, J. Jr., (1964) Adrenalin, noradrenalin and performance in a visual vigilance task. Human Factors Research Tech. Rep. #750-5, 36pp. (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.), (AD-606 136)
- O'Hanlon, J. & E. A. Schmidt (1964) The effect on the level of vigilance of an adjacent secondary vigilance task. Human Factors Research Tech. Rep. #750-4, 27pp.
  (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif) (AD 437-334)
- O'Hanlon, J Jr, E. A Schmidt & C. H. Baker (1964) A study to determine the effects of placebos upon performance in a vigilance task. Human Factors Research Tech. Rep. #750-3, 16pp (Human Factors Research, Inc., 1112 Crenshaw Blvd., Los Angeles 19, Calif.) AD-428 565)

- Osborn, William C., R. W. Sheldon & R. A. Baker (1963) Vigilance performance under conditions of redundant and non-redundant signal presentation. J. appl. Psychol., 47, 130-34.
- (Psychol. Abstr., 1963, #7547)
  135. Pope, Louis Trueman (1961) A study of signal variables and level of alertness
- in visual and auditory vigilance. Ph D. Diss, Univ Houston, 115pp. 136. —(1962) Diss. Abstr., 22, 2480.

(Psychol. Abstr., 1963, #7338)

- Pope, Louis T. (1962) Attention level and visual and auditory monitoring performance. USAF AMRL Tech. docum. Rep. #62-97, iii, 20pp.
  (Behavioral Sciences Laboratory, 6570th Aerospace Medical Research Laboratories, Aerospace Medical Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio)
  (Psychol. Abstr., 1964, #3338)
- Pope, Louis T. & D. F. McKechnie (1963) Correlation between visual and auditory vigilance performance. Behav. Sci. Lab **Tech. docum. Rep.** #63-57, 6pp. (Behavioral Sciences Laboratory, 6570th Aerospace Medical Research Laboratories, Aerospace Medical Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio)
  - 139. Ray, J. T. O E Martin & E A. Allusi (1961) Human performance as a function of the work-rest cycles. NAS-NRC Publ. #882. (National Academy of Sciences, National Research Council, Washington, D C.)
- 140 Roby, T. B. & H. Roazen (1963) Signal and channel load in vigilance tasks. Percept. mot. Skills, 16, 641-47.

  (Psychol. Abstr., 1964, #4967)
- 141 Roth, B. (1961) Clinical and theoretical importance of EEG rhythms corresponding to states of lowered vigilance. **EEG clin. Neurophysiol.**, 13, 395-99. (Psychol. Abstr., 1962, #3DG95R)
- 142. Schmidtke, Heinz & H C. Micko (1964) Untersuchungen über die reaktionszeit bei dauerbeobachtung (Studies on reaction time during continuous observation).

  Opladen, Germany: Westdeutscher, 104pp.

  (Psychol. Abstr., 1965, #6514)
- 143. Semmel, Melvyn I. (1963) Arousal theory applied to vigilance behavior of educable mentally retarded and average children. Ph.D. Diss., George Peabody College for Teachers, 166pp.
- 144. —(1964) Diss. Abstr., 24, 5578. (Psychol. Abstr., 1965, #3332)
- 145 Sipowicz, R. R. & R. A. Baker (1961) Effects of intelligence on vigilance: a replication. Percept. mot. Skills, 13, 398.
- 146. Sipowicz, Raymond R., R. J. Ware & R. A. Baker (1962) The effects of reward and knowledge of results on the performance of a simple vigilance task. J. exp. Psychol., 64, 58-61.
  (Psychol. Abstr., 1963, #4316)
- 147. Smith, Richard Petri (1961) The effects of signal density and temporal uncertainty on human vigilance.
  Ph.D. Diss., Emory Univ.

- 148. E. A. Alluisi (1962) Vigilance performance and the temporal uncertainty of signals. (Human Factors Research Department, Operations Research Division, Marietta, Ga.)
- 149. Tarriere, C. & A. Wisner (1962) Effets des bruits significatifs et non significatifs au cours d'une epreuve de vigilance (Effects of significant and non-significant noises on vigilance). Travail hum., 25, 1-28.

  (Psychol. Abstr., 1963, #2938)
- 150 Taub, Harvey A. & W. H. Teichner (1963) Effects of differential value and exposure time upon the detection and memory symbols in a visual search task.

  Tech. docum. Rep. #63-343, 48pp. (Decision Sciences Laboratory, Deputy for Engineering and Technology, Electronic Systems Division, Air Force Systems Company, L. G. Hanscom Field, Bedford, Mass.)
- 151. Taylor, J. R. & G. L. Mangan (1962) Perceptual learning and verbal learning. Percept. mot. Skills, 14, 223-29. (Psychol. Abstr., 1963, #1345)
- 152. Teichner, W. H. (1962) Probability of detection and speed of response in simple monitoring. Hum. Factors, 4, 181-86
- 153. Thompson, L. W., E. Opton, Jr. and L. D. Cohen (1963) Effects of age, presentation speed, and sensory modality on performance of a "vigilance" task. J. Geront., 18, 366-69
  (Psychol. Abstr., 1964, #4983)
- 154 Tiedemann, John G. (1964) Research activities on performance in Army monitor systems USA PRO Tech. Res. Rep. #1139, 18pp (U. S. Army Personnel Research Office, Washington 25, D. C.)
  Psychol. Abstr., 1965, #8847)
- 155 Ugelow, Alvin (1960) Some characteristics of the signal in a vibratory vigilance task. Ph.D. Diss., Penna. State Univ., 99pp.
- 156. —(1960) Diss. Abstr., 21, 249. (Psychol. Abstr., 1961, #1652)
- 157 Wade, E A., L. L Janke, R. M. Stern & P. D. Lipsitt (1961) Vigilance, fatigue and stress in air surveillance (SAGE) Inst for Psych. Res. Tech. Rep. 61-26. (Institute for Psychological Research, Tufts Univ., Medford 55, Mass.)
- 158 Ware, J. R. (1961) The effects of intelligence on signal detection in visual monitoring. Percept. mot. Skills, 13, 99-102.
- 159. Ware, J. R., R. A. Baker & R. W Sheldon (1964) Effect of increasing signal load on detection performance in a vigilance task. Percept. mot. Skills, 18, 105-06. (Psychol. Abstr., 1965, #324)
- 160. Ware, J. R., R. A. Baker & R. R. Sipowicz (1962) Performance of mental deficients on a simple vigilance task. Amer. J. ment. Defic., 66, 647-50 (Psychol. Abstr., 1962, #4JI47W)
- 161. Webber, Carl E. & J. A. Adams (1964) Effects of visual display mode on 6 hours of visual monitoring. USAF SAM Tech. docum. Rep. #64-34, 10pp. (Psychol. Abstr., 1965, #6435) (AD 604-456)

- 162. Weidenfeller, E. W., R. A. Baker & J. R Ware (1962) Effects of knowledge of results (true and false) on vigilance performance Percept. mot. Skills, 14, 211-15.
  (Psychol. Abstr., 1963, #2158)
- 163. Wiener, Earl Louis (1961) Knowledge of results and the monitoring problem. Ph.D. Diss, Ohio State Univ., 68pp.
- 164 —(1962) Diss. Abstr., 22, 4102-03. (Psychol. Abstr., 1963, #7356)
- 165. Wiener, Earl L (1962) Knowledge of results in a monitoring task USAF AMRL Tech. docum. Rep. #62-82, vi, 44pp (Behavioral Sciences Laboratory, 6570th Aerospace Medical Research Laboratories, Aerospace Medical Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio) (Psychol. Abstr., 1964, #3289)
- 166 Wiener, Earl L. (1963) Knowledge of results and signal rate in monitoring J. appl. Psychol., 47, 214-22. (Psychol. Abstr., 1963, #8331)
- 167 Wiener, Earl L (1964) Transfer of training in monitoring signal amplitude Percept. mot. Skills, 18, 104.

  (Psychol. Abstr., 1965, #326)
- 168 Wiener, Earl L (1964) Multiple channel monitoring Ergonomics, 7, 453-460. (Psychol. Abstr., 1965, #8773)
- 169. Wiener, Earl L., G. K. Poock & M. Steele (1964) Effect of time-sharing on monitoring performance: simple mental arithmetic as a loading task. Percept. mot. Skills, 19, 435-40.
- 170. Wilkinson, R. T. (1961) Comparison of paced, unpaced, irregular and continuous display in watchkeeping Ergonomics, 4, 259-67. (Psychol. Abstr., 1962, #3LK59W)
- 171. Wilson, Jerusa Carl (1962) An investigation of vigilance in the rhesus monkey. Ph.D. Diss., Univ Maryland, 50 pp
- 172. —(1963) Diss. Abstr., 23, 3002. (Psychol. Abstr., 1964, #3940)
- 173. Wokoun, William (1963) Vigilance with background music. USA HEL Tech. Memo #16-63 (U. S. Army Human Engineering Laboratories) (AD 433624)
- 174. York, Cyrus Michael (1961) Behavioral efficiency in a visual monitoring task as a function of signal rate and observer age.
  Ph.D. Diss., Univ. Maryland, 116pp
- 175 —(1961) Diss. Abstr., 22, 2085 (Psychol. Abstr., 1963, #3982)
- 176. —(1962) Percept. mot. Skills, 15, 404 (Psychol. Abstr., 1963, #8345)

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Early literature on vigilance research was b-rought together by James J. McGrath* in 1961. The present bibliography, listing 176 new titles, including papers on the rhesus monkey and the cat, covers the reference period from 1961 to mid-1965 and brings this vigilance bibliography up to that date. Reference sources are the Psychological Abstracts and the articles themselves. A rudimentary index prepared from article titles, abstracting descriptors, and in some cases, the papers themselves appears at the end of the bibliography.					
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